

Improving Structural Integrity Monitoring Capability for Water Mains: Collaboration Efforts and Opportunities

Michael Royer

Physical Scientist

U.S. EPA Office of Research and Development(ORD)/National Risk Management Research Laboratory (NRMRL)/Water Supply and Water Resources Division (WSWRD)/Urban Watershed Management Branch (UWMB)

(732) 321-6633

royer.michael@epa.gov

Authors: Michael D. Royer, Anthony N. Tafuri

U.S. EPA ORD/NRMRL/WSWRD/UWMB

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The structural integrity of the approximately 1,000,000 miles of U.S. water mains is important to both immediate and long-term drinking water quality and availability. As pipes wear out, leaks and main breaks increase, as well as the associated occurrences of water loss and low pressure-induced contaminant entry. Although drinking water quality is generally good now, about 30% of drinking water distribution mains are in fair or poor condition. Drinking water mains represent over 50% of the value of our drinking water infrastructure, and it is too costly and time-consuming to complete all the required replacements in a few years. However, the number of major main breaks and leaks can be reduced by assessing the pipes' condition and then addressing first the worst-condition, highest-risk pipes.

This poster will describe the U.S. Environmental Protection Agency (U.S. EPA)/ORD efforts and opportunities to accelerate improvement of structural integrity monitoring (SIM) capability for water main application by collaborative efforts with the user community, within the U.S. EPA, and with other federal agencies that have substantial SIM research and development programs. The marketplace will ultimately select the SIM capability winners and losers, but federal research participation can significantly improve the timely availability and evaluation of technologies for effective, safe, and sustainable management of the integrity of drinking water mains.

Improved SIM capability will increase the quantity, quality, timeliness, and/or economy of data that are needed to determine pipe structural condition and to schedule condition-based repair, rehabilitation, and replacement. Sensors, for example, are one of the most promising areas to explore since they are being improved with regard to sensitivity, coverage, speed, durability, size, energy requirements, and cost. Effective collaboration between the water industry, the U.S. EPA, and other federal agencies that have active SIM research efforts for non-drinking water pipeline applications (e.g., Department of Transportation, Department of Energy, Department of Defense, Department of Commerce, and National Science Foundation) will expand and accelerate the exploration of numerous opportunities for improving SIM capability for water mains.